Antagonistic activities of endophytic bacteria against Fusarium wilt of black pepper (Piper nigrum).

ABSTRACT

Fusarium wilt is a fungal disease, which affects a broad range of plants including black pepper (Piper nigrum). Fusarium solani f. sp. piperis is a common causal agent of root rots and stem blight in black pepper. F. oxysporum Schl. f. sp. piperis, a less common but an important pathogen of black pepper. The biological approach to control F. oxysporum is becoming popular in many crop plants however there is lack of scientific record in black pepper. Endophytic bacteria were isolated from black pepper roots and cultured on nutrient agar. The bacterial isolates were screened for in vitro antagonistic activity against F. oxysporum through dual culture, mycelial growth, spore germination and double plate tests. Five isolates with promising antifungal activity were further identified through 16S rDNA sequencing. Isolates EB1 and EB2 showed highest antagonism against F. oxysporum mycelia with the percentage of inhibition up to 43% and 41%, respectively. Isolated EB3, EB4 and EB5 produced clearing zones in spore germination test with radii measurements at 12.5-15.0 mm. The antifungal activities apparently involved the secretion of volatile and diffusible bioactive compounds. Analysis of the 16S rDNA sequences suggested the closest identities of the bacterial isolates as Bacillus megaterium, Bacillus cereus, Enterobacter sp. and Bacillus sp. Five endophytic bacteria isolates demonstrated significant control over both mycelia growth and spore germination of F. oxysporum. Some of these bacteria might possess additional beneficial plant growth promoting and insecticidal properties for the development of multi-function products in black pepper farming.

Keyword: Bacillus spp.; Biocontrol; Enterobacter; Fusarium oxysporum